

# Novel Microgreen Crop Testing for Space



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# Background

- Increase the number of crops that can be reliably grown in space under narrow band LEDs and elevated CO<sub>2</sub> (~3000 ppm)
- Select crops that address nutritional deficits and meet crew acceptability



# Materials and Methods

- Microgreen cultivars selected
- Cultivated in NFT system
- 3000 ppm CO<sub>2</sub>, 50% Relative Humidity, 23°C, and PPF ~300 μmol m<sup>-2</sup> s<sup>-1</sup>
- Samples were harvested
- Nutritional analysis was conducted by outside lab
- Samples were washed, packaged and shipped to Johnson Space Center Food Laboratory for sensory analysis





# Microgreen Cultivars

Crop Type	Cultivar
Bean	Mung Beans
Beet	Detroit Mix
Beet	Bulls Blood
Brussels Sprouts	Long Island Improved
Chia	Black OG
Collards	Vates
Cress	Cressida
Cress	Upland
Grain	quinoa
Grain	Buckwheat Groats
Kohlrabi	Early White Vienna
Kohlrabi	Purple Vienna
Lentils	Green
Melon	Cantaloupe
Mustard	Tatsoi
Nasturtium	Empress of India
Nasturtium	Alaska
Orach	Purple
Pea	Dun
Pea	Snow Pea, Dwarf Sugar Grey
Pea	Snow Pea, Mammoth Melting Sugar Pod
Pea	Dwarf Grey Sugar Pea
Pea	Mammoth Melting Sugar Pea
Root	Carrot
Shiso	(Perilla) Green
Sunflower	Black Oil
Swiss Chard	Yellow
Tree	Chinese Mahogany



# Sensory Results

Average							
Sample	Overall	Appearance	Color	Aroma	Flavor	Texture	
Dun Pea	7.1	8.0	8.1	6.3	7.1	7.7	
Sunflower	6.8	7.9	8.0	6.5	6.5	7.4	
Buckwheat	6.7	7.3	7.3	6.6	6.6	6.6	
Collards	6.7	7.8	7.8	6.3	6.6	7.4	

Average						
Sample	Tenderness	Bitterness	Crispness	Nuttiness	Sweetness	Aromatic
Dun Pea	3.0	3.5	3.1	2.9	2.6	2.6
Sunflower	3.0	3.7	2.8	2.7	2.7	2.6
Buckwheat	3.3	3.3	2.7	2.7	2.6	2.9
Collards	3.0	3.3	2.8	2.9	2.5	2.6

## Dun Pea

### Pros

- Could definitely taste the raw pea-bean flavor.
- Crispy and extremely fresh
- Beautiful color

### Cons

- Dislike too much stem
- Not much aroma
- Too bitter

## Sunflower

### Pros

- Good leaf to stem ratio
- Beautiful green color and nice and crispy
- Buttery mouth feel

### Cons

- Too tender
- No aroma
- Too bitter

## Buckwheat

### Pros

- Tasted slightly 'grassy', brought back childhood memories of rolling around on the lawn!
- Fresh taste with very little bitterness

### Cons

- Wilted
- No aroma
- Too much stem

## Collards

### Pros

- Enjoyed slight spicy and nutty flavor
- Crispy and fresh
- Liked them and would be a good thing to have in flight to add flavor

### Cons

- Grassy
- Not much aroma



The background of the slide is a photograph of a dense field of green microgreens. A vertical ruler is visible in the upper center, showing measurements in centimeters. On the left side, there is a solid orange arrow pointing to the right. The title 'Next Steps and Conclusions' is written in a large, white, sans-serif font, centered over the image.

# Next Steps and Conclusions

- Nutritional analysis to be completed on down-selected cultivars
- Microgreens grow well in mission relevant environmental conditions
- Selected microgreens are palatable to tasters thus far